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THE WHITE HOUSE
WASHINGTON

PRESIDENT'S FOREIGN INTELLIGENCE ADVISORY BOARD

June 15, 1965

MEMORANDUM FOR THE PRESIDENT

SUBJECT: U. S. Intelligence Community Capabilities
for the Handling of Intelligence Information

This report is based on a study made by the Communications Panel of the President's Foreign Intelligence Advisory Board. The study included consultations with knowledgeable representatives of the departments and agencies making up the U. S. intelligence community, and briefings supplied by the Committee on Documentation of the United States Intelligence Board (USIB) which, under the chairmanship of the Director of Central Intelligence, has been pursuing the current exercise known as SCIPS (Staff for Community Information Processing Study).

Our Panel's study leads us to the following conclusions and resultant recommendations for action in an area of U. S. intelligence activities which we consider to have a most important bearing on the national defense and security.

The principal objective of these recommendations is the prompt initiation by the U. S. intelligence community of positive steps toward the achievement of an improved capability for the efficient storage and retrieval of the intelligence product, through an appropriate combination of machine and human techniques for the management and control of the massive volume of intelligence information involved.

CONCLUSIONS:

1. Information-handling methods occupy a pervasive position in the whole administrative framework of the U. S. intelligence community. Present methods for handling the huge quantity of intelligence information, which is generated from day-to-day by a vast array of collection resources, are a determining factor in the effectiveness of our entire intelligence system to meet national security needs at policy and command levels of the Government.

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2. The systems problems involved are so massive and in many cases so expensive, in both money and human resources, that customary routines have often been rigidly embodied and retained. The systems problems of intelligence information access will continue to be of the most difficult type, heightening the importance of great improvements in the depth of understanding and of skills in tackling the wide variety of such problems which confront all levels of Government personnel concerned with access to the national intelligence base.

3. There is a necessary relationship of the United States Intelligence Board SCIPS study to the existing practices of information handling which are variously applied within the respective agencies engaged in the U. S. intelligence effort, particularly in regard to such matters as file format and file control methods. However, the present great demands for effective handling of information within the intelligence community require that additional actions go forward concurrently with those presently approved by the United States Intelligence Board.

4. The additional actions which are required provide the only foreseeable means of extending to the massive operations of the intelligence community the advantages of high-speed machine processing of both numerical and non-numerical information in a way which has already been applied in such specific areas of intelligence as cryptanalysis. Unless strong and immediate actions are undertaken in this area, there is danger that the efficiency of the production and dissemination of intelligence within the intelligence community will decline progressively, and that the already high costs involved will climb so steeply as to jeopardize national support of the broad intelligence effort.

5. Positive action is required now to supplement the longer-range Task Force projects being pursued by the United States Intelligence Board. A large share of the needed technical support will come from automatic data-processing machinery and methods, and from the resources of modern science and technology which are presently available to assist in meeting intelligence community needs for document handling all the way from initial production to final distribution. The need for new intelligence community actions for the handling and routine processing of intelligence information is not regarded as a direct consequence of the rise of the electronic computer. The need for such actions is more deeply the result of the growth of the intelligence community effort and the greater growth of the information which it must handle.

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The role of the computer is in offering a new way to assist in the reduction of greatly increasing problems in the intelligence field. The existence of these problems and the need to do things about them would have confronted the intelligence community in any event.

6. All the technical areas which must contribute to the problems of handling intelligence information are advancing very rapidly at present. The intelligence community, with its strong nucleus concerned with the use of computers in cryptanalytic and communications operations, has a real advantage in undertaking early and skillful planning in the information-handling area. (It would, however, be a mistake to assume that this experience can be easily applied to the use of computers in the handling of intelligence information.) The required planning and actions can be not only of great value to the intelligence community, but can be a broad and effective stimulus to improvement in other Federal Government computer operations whose importance is reflected in the President's recent message to the Congress on the use of automatic data-processing equipment.

7. The problems of the intelligence community in connection with information access and retrieval include, but are not restricted to, those common to all who must maintain very large bodies of information in accessible form. This is even true in the handling of information from unclassified sources. The importance of negative information, and of patterns of information, requires that access to intelligence information produce a completeness of response beyond that which is expected from many large files of stored information. Like statistics, intelligence cannot be satisfied with the highly anecdotal, but requires that all available items of information are allowed to contribute their part to the final summary or other intelligence product.

8. As a consequence of intelligence community requirements for high recall, the mechanized and automated means of access to many sorts of intelligence files cannot be required to meet simultaneously, rigid requirements as to relevance. Accordingly for some time to come the mode of gaining access to intelligence information will be through combined machine-human systems that will seek the machine retrieval of stored intelligence information in order that its relevance may be established by human examination. It is this combined machine-human factor which generates systems problems of great difficulty and dimensions.

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9. Ways and means must be sought by the intelligence community to enlarge the proficiency of personnel presently engaged in information-handling activities, either through (a) the retraining of personnel so engaged, or (b) the addition of new personnel having experience with systems work, preferably (but not necessarily) in the information sciences and technologies.

10. The scope of the intelligence community's problems in the information-handling field is such that it requires the guidance of a Panel of Technical Experts in the development of methods and facilities for information-handling and access.

11. In the area of experimental approaches to the adaptation of machine processing to the storage and retrieval of intelligence information, an encouraging beginning has been made within the National Security Agency where the Technical Information Processing System (TIPS) study is presently under way. This experiment, although on a limited scale and confined to a selected number of organizational units and information files within the National Security Agency, is producing important lessons for the achievement of a realistic system for the interrogation of a computer by remote users requiring access to a common information base.

RECOMMENDATIONS:

We recommend that the following actions be undertaken immediately within the intelligence community:

Recommendation No. 1: That selected personnel among the departments and agencies making up the U. S. intelligence community be provided specialized training and advanced studies at a university center or centers where systems thinking and systems skills are understood and imparted, and which at the same time possess adequate background in conventional bibliography and other more classical approaches to literature and information management.

An example of the type of specialized training center we have in mind is the Library School at the University of Chicago, headed by Dean Don W. Swanson. His background in mathematics and physical sciences, and his current emphasis on increased systems thinking in library education, accent the combination of educational capabilities and background which are considered necessary for purposes of meeting the objective of this recommendation.

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Arrangements involving this and perhaps other institutions might be made so that both senior administrative personnel and more junior operating people could acquire new abilities and attitudes which in the times ahead will be demanded in the discharging of responsibilities for the enormous file and distribution systems of the intelligence community.

Recommendation No. 2: That the Technical Information Processing System (TIPS) project, now under way within the National Security Agency, be expanded to include participation by other member agencies of the intelligence community in an experimental operating system constituting a first step toward interagency (and interbuilding) information handling. Since results should be sought from the experiment as promptly as feasible, the participation of other agencies should be achieved by September of 1965; the capability for extensive handling of the Russian biography problem should be available in the community-wide system by the summer of 1966; and by the summer of 1967 it should be possible to exchange outputs from various mechanized sources in the fashion pioneered by the TIPS project.

Only through such experimental operational trials can the intelligence community come to grips with the wide variety of program problems involved, including those of security compartmentation, the encryption of communications between the computer/information base and the user locations, and other problems. In order to make such a trial effective, it may be necessary to expand the scope of the information maintained in the TIPS system and, if so, this should be done with caution as to the total amount of material thus added. The intention should be to establish a system that will in fact be used by workers in at least a few agencies as a better way to meet day-to-day tasks; however, the system should be regarded as experimental and there should be no attempt to insure that in its experimental form its operation can be economically justified.

Recommendation No. 3: That there be established a Panel, under the joint sponsorship of the Special Assistant to the President for Science and Technology and the President's Foreign Intelligence Advisory Board, having responsibility for: (a) providing guidance to the intelligence community in the forwarding of methods and facilities for information handling and access;

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CODIB-D-113/5.7
2 February 1967

UNITED STATES INTELLIGENCE BOARD
COMMITTEE ON DOCUMENTATION

INFORMATION SCIENCE TRAINING FOR
INTELLIGENCE COMMUNITY PERSONNEL

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CODIB-D-113/5.7
2 February 1967

INFORMATION SCIENCE TRAINING FOR INTELLIGENCE COMMUNITY PERSONNEL

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INFORMATION SCIENCE TRAINING FOR INTELLIGENCE COMMUNITY PERSONNEL

1. INTRODUCTION

a. This report concerns the training of intelligence community personnel in the academic disciplines of information science and the technical skills associated with the mechanized handling of intelligence information. The report responds to the "system training" recommendation of the President's Foreign Intelligence Advisory Board forwarded to the Director of Central Intelligence for implementation in July 1965.

b. This report stresses the necessity for a balanced program which provides a wide range of training in the skills and techniques of employing the information sciences in our day-to-day intelligence jobs, as well as the long-term, formal education of selected personnel in university graduate-level information science programs. The conclusions and recommendations presented herein are aimed at achieving such a balanced program which recognizes both the need for different types of training and the practical hardships imposed on the manager by participation in extensive training activities.

2. BACKGROUND

a. The President's Foreign Intelligence Advisory Board (PFIAB) submitted the following recommendation to the President on 15 June 1965:

"That selected personnel among the departments and agencies making up the U. S. intelligence community be provided specialized training and advanced studies at a university center or centers where systems thinking and systems skills are understood and imparted, and which at the same time possess adequate background in conventional bibliography and other more classical approaches to literature and information management."

[An example of the type of specialized training center we have in mind is the Library School at the University of Chicago, headed by Dean Don R. Swanson. His background in mathematics and physical sciences, and his current emphasis on increased systems thinking in library education, accent the combination of educational capabilities and background which are considered necessary for purposes of meeting the objectives of this recommendation. Arrangements involving this and perhaps other institutions might be made so that

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both senior administrative personnel and more junior operating people could acquire new abilities and attitudes which in the times ahead will be demanded in the discharging of responsibilities for the enormous file and distribution systems of the intelligence community.]

b. The PFIAB, in forwarding its recommendations to the President, also commented that:

"Ways and means must be sought by the intelligence community to enlarge the proficiency of personnel presently engaged in information-handling activities, either through (a) the retraining of personnel so engaged, or (b) the addition of new personnel having experience with systems work, preferably (but not necessarily) in the information sciences and technologies."

c. The recommendation of the PFIAB was approved by the President and passed to the Director of Central Intelligence on 15 July 1965 for implementation.

3. TERMS OF REFERENCE

a. The PFIAB used three terms (i.e., "system thinking", "systems skills", and "information sciences and technologies") which lack precise, universally accepted definitions. The following sample definitions are given to aid in establishing a minimum level of common understanding of the terms to be used in this report:

(1) SYSTEMS THINKING (or systems approach) - a way of thinking about or looking at a situation or task, particularly a complex task. Specifically, the term describes the process of examining and studying a system in its totality with full consideration being given to the intrarelationships within the system as well as the interrelationships between the system and its surrounding systems or environments. [SYSTEM is an assembly of procedures, processes, methods, routines or techniques united by some form of regulated interaction to form an organized whole; an organized way of accomplishing something; a collection of operations and procedures, men and machines, by which a business is carried on..]

(2) SYSTEMS SKILLS - a convenient (but imprecise) term to describe the spectrum of professional disciplines and technical specialties required for the planning, development and operation

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of systems. In the context of an automated information handling system, the term can encompass such diverse areas as hardware engineers, mathematicians, computer programmers, equipment operators, and keypunchers.

(3) INFORMATION SCIENCES (AND TECHNOLOGIES). Here, the problem of definition is so basic that there isn't even agreement as to whether there is a single science of information or several sciences of information. Following are some examples of definitions used in the Symposium on Education for Information Science held in Warrenton, Virginia, 7-10 September 1965:

INFORMATION SCIENCE - the science that investigates the properties and behavior of information, the forces governing the flow of information, and the means of processing information for optimum accessibility and usability. The processes include origination, dissemination, collection, organization, storage, retrieval, interpretation and use of information. The field is derived from or related to mathematics, logic, linguistics, psychology, computer technology, operations research, the graphic arts, communications, library science, management, and some other fields.

INFORMATION SCIENCE - an interdisciplinary field of study of the nature, properties, control, and use of information. Its underlying object of study, information, is a content-bearing element in the process of communication, problem solving, decision making and learning.

INFORMATION SCIENCE - an aggregation of disciplines that promises to provide: (1) a calculus of formal systems; (2) an applied computational linguistics; (3) a modeling and application of information-processing procedures, all of which (a) are constructive for the handling of finite problems in artificial intelligence and communication, (b) are coordinate with effective engineering implementation, and (c) constitute a fresh source of inspiration towards the traditional disciplines of the life sciences and of mathematics.

INFORMATION SCIENCES - are based primarily on the applications of mathematics to the phenomena of message generation, storage, organization, structure and transfer. Their study is not concerned with the development of

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retrieval systems, but rather with the explication of both system and environment. This they accomplish by exploiting the theories of mathematics, logic, linguistics, psychology, and neurophysiology, as well as those of their emerging combinations - automata theory, self-organizing systems, etc. What the information scientist does may or may not have immediate effect on information handling systems. That is not important. What is important and distinctive is that, by critically analyzing current systems, he is providing a quantitative approach and theoretical base for the systems of tomorrow. [This definition is considered to be only half of an as yet unnamed subject area whose other half is INFORMATION ENGINEERING (TECHNOLOGY) - the design, operation, and management of systems for handling messages or packages of messages. These systems include libraries and their subsystems, information and data centers, publishing and dissemination, management information; and all the offshoots of these such as indexing and abstracting, selective dissemination of information, and even the semi-formal systems that have evolved within a subject field in response to the communication needs of that field and its professional workers.]

COMMENT CONCERNING INFORMATION SCIENCE - The temptation to pour information science into the mold of one's own expertise and competence is difficult to avoid. Information science exists in the eyes of the many beholders. At the present time one can only conclude that the phrase "information science" is more an expression of hope or a slogan to rally around than it is the name of a profession.

b. It should be noted here that the term "information science" includes far more than just computer science. The recognition that computer science is merely one facet of information science is crucial to the understanding of this report and is the practical basis for the wide range of training activities being recommended.

4. DISCUSSION

a. Observations on Current Status

(1) With the possible exception of a very few systems, including some of those in the cryptologic area, the intelligence

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community hasn't had any greater success (or failure) in developing truly effective automated information handling systems than have the other functional areas of the Federal Government. The community's exploitation of available technology has been limited in many instances to the development of information storage and retrieval systems which duplicate but do not necessarily improve upon existing manual processes. There has not been enough progress in designing advanced, revolutionary methods of handling intelligence information and giving the production analyst new analytical tools. For example, not many community analysts today have systems which permit them to turn to a console and use the computational power of a digital computer to quickly test a quantitative hypothesis or manipulate data in a trend analysis or receive electronic displays of information. In most instances, the analyst has not been integrated into his supporting system and must communicate with the system through intermediaries. The community's system development pattern is influenced by the newness of technology and the lack of personnel qualified to effectively exploit that technology. ||||

(2) The pressures to keep current on daily operations have influenced the pattern of training information-system personnel. The primary objective of training has been to produce technicians who can extract some measure of work from available hardware; there hasn't been much emphasis on the training of information system theoreticians and strategists. In effect, we have concentrated on the training of "pilots" and not "aeronautical engineers". An appropriate mix of both the specialist/technician and the theoretician/strategist is needed to develop the types of systems that are required and are now within technical grasp.

(3) Systems or information science knowledge, theoretical as well as practical, needs to be imparted to substantive information people as well as systems or data processing people. The user of information systems cannot afford to leave the conceptual design of his future systems completely in the hands of the systems specialist.

(4) The intelligence community does not have an integrated program of graduate level information sciences education. Although a small number of community personnel are receiving such training by various means, e.g., full-time resident study, off-campus study, and special Government/industry courses, there is little evidence of positive, broad scale action to cope with what may well be the community's major training problem. The community's

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efforts to date certainly do not approach the magnitude of the National Library of Medicine's attempt to establish a Master of Science degree in Biomedical Communication involving over five universities (Georgia Tech, Tulane, Nebraska, Texas and others). The community's actions to date have not contributed significantly to the training and development of a cadre of information scientists.

(5) It should be noted here that, while training is an acknowledged necessity in almost every type of activity, the manager assigned the responsibility for mission accomplishment cannot close his shop while he trains his people to some optimum level of proficiency. While most managers realize that they can do a better job with better, more highly trained people, there are real obstacles in the way of getting better people. In the practical environment of daily operations, heavy production schedules, security and space problems and budgetary limitations, training frequently becomes an activity which must be judiciously squeezed into overall operations without significant detriment to mission accomplishment. In this context, training is used whenever it will contribute to longer range objectives without jeopardizing the accomplishment of current objectives. The pace of training in the information science area has been geared generally to the community's capability to reasonably absorb and effectively use automatic equipment in the handling of intelligence information. This means, then, that the community has concentrated on training its people to exploit existing information technology, and has given significantly less attention to training people to exploit future technology. The intelligence community, because of its accumulated experience with ADP and the advances in information science technology, is aware of the need for a wide range of training programs, including graduate level systems training of the type recommended by the PFIAB.

b. Implications of the PFIAB Recommendation

(1) The PFIAB recommendation, while encompassing the general upgrading of knowledge levels of personnel engaged in

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information systems work, seems primarily oriented to the relatively gradual, intermediate-range improvement of the community's capability to manage its intelligence information problems and exert a strong, creative influence on the development of advanced systems. A primary inference of the recommendation (and its accompanying comments) is that the PFIAB views senior management's education (and that of selected operating personnel) as a more critical problem than the education of systems specialists and technicians. A secondary inference is that the PFIAB believes the intelligence community can benefit from increased exposure of some of its senior managers to the forces outside the community which are shaping the information sciences and technologies. Dependent upon the astuteness of the managers selected for training, such a program might give the community a greater rapport with these forces.

(2) The plausibility of the above primary inference can be seen in the Bureau of the Budget's "Report to the President on the Management of Automatic Data Processing in the Federal Government" which states:

"Management officials in agencies should make decisions on the uses to be made of computers, rather than leave these determinations to specialists in equipment and in systems design. As proponents of the use of computers, specialists can be most effective; their technical advice is an essential factor in decision-making. However, those who are responsible for mission accomplishment should be prepared to make final decisions. Involving line management officials in this way will aid in insuring that objectives for the use of electronic data processing equipment in mission accomplishment are carefully established and clearly understood; that adequate resources are made available to insure that objectives will be achieved; that proper recognition is accorded to the magnitude and complexity of the task; that full cooperation and support of the total organization is obtained; and that marginal uses are minimized".

(3) Numerically, there are many more systems training facilities for operating-level information systems specialists than there are for managers and users of information. Government, industry and private institutions offer a variety of training courses in systems design, computer programming, equipment operations, systems analysis, etc. Many of these courses are of good quality and, when combined with suitable on-the-job training,

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produce effective systems specialists -- in fact, most of the systems in operation today have been designed and built by people who received their training this way. Such is not the case with regard to the education of information managers. First, there aren't many courses offered specifically for the manager. Second, the courses which are available frequently contribute very little to changing the manager's attitudes and increasing his capability to cope with the rapidly growing problems of information.

(4) The type of training recommended by the PFIAB appears aimed largely at producing a cadre of community personnel who are highly trained in the theories of information and the foundations and potential of modern information technology and who, at the same time, have sufficient practical knowledge of the subject area and the system specialist's area to assume an active leadership in the development of advanced information systems. Using university centers to train more than a relatively small cadre of people isn't feasible because of cost and the impracticality of removing numbers of key people from operating staffs for a year or more.

(5) The PFIAB recommendation focuses attention on the necessity for graduate level systems training for selected personnel now to prepare them for future responsibilities in exploiting the technology that is already becoming apparent and in grappling with the enormous file and distribution systems that will soon confront the community. This is a proper focus because graduate education in information science, being a long lead time item, must be started now to insure the availability of required personnel skills two or more years from now.

(6) The PFIAB recommendation does not address the critical need for types of information science training that lie outside the university centers. These types of training are an extremely important aspect of the community's overall systems training requirements. There is an extensive need for education within the community, from the analyst level up through top management, in the skills and techniques of employing the information sciences in day-to-day intelligence tasks. This kind of education in modern analytical and managerial techniques can be provided in existing intelligence schools if suitable curricula are developed and resources are applied.

(7) The PFIAB recommendation ties training in systems

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thinking and systems skills to education in library science. While there is an important relationship between library science and intelligence operations, not all of the community's information handling problems can be effectively solved by modern library science. Because library science is not the totality of information science, it follows, therefore, that some community personnel should receive information science education in a context other than pure library usage. Accordingly, this report is not limited to a consideration of only the library science schools where information science subjects are taught.

c. The University Centers

(1) Educators, professional groups, industry and the Federal Government are heavily engaged in trying to define the field of information science and technology, and to identify the specific subjects which would go into the development of responsive professional training programs and curricula. Although progress toward definition is being made and several universities have initiated graduate level information science programs, an information science discipline does not exist yet. Indications are that the foundations of such a discipline are taking shape and that discipline status will be achieved.

(2) In a review of 1965 literature for American Documentation Institute's first Annual Review of Information Science and Technology, Professor Robert S. Taylor (Lehigh University) states that there are two types of university programs:

(a) Information Engineering - operations and problem oriented; originating in both library and non-library schools, it concentrates on definition of program content and the type of graduate to be produced.

(b) Information Sciences - concept oriented; concentrates on the definition of a formal or intellectual discipline.

The first type, characterized by the Graduate Library School, University of Chicago, is oriented to the library science curriculum with varying degrees of stress on computer technology. The second type, characterized by the School of Information Science, Georgia Institute of Technology, emphasizes the theory and basic foundation of information science and tries to prepare students for research and professional practice.

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(3) Most of the information science programs currently being offered have three common characteristics -- they are inter-disciplinary in nature, they are all undergoing continuous change, and they are given primarily at the graduate level. Most of the programs have roots in each of the major academic departments and colleges of the university and make heavy use of courses in mathematics, statistics, linguistics, psychology, man-machine interaction, industrial engineering, electrical engineering, philosophy, communications theory, and library science. With the exception of a small core program, the student has extremely broad latitude in the selection of courses and sub-specialties. Most of the programs are being revised and improved continuously to meet new needs and incorporate technology advances.

(4) Some authorities believe that the programs in the library schools suffer two other common characteristics -- they don't have the qualified instructors to develop really new courses and curricula, and they are unable to attract students with strong mathematical and scientific backgrounds. As a result, the library school programs may be best qualified to train service-oriented personnel who are professionals in the literature of a single subject area.

(5) In the preparation of this report, five university information science graduate programs (two library schools, two non-library schools, and one combination library/non-library school) were studied to get a representative picture of the types of training currently available which might be pertinent to the PFIAB recommendation. The two library school programs were those at the Graduate Library School, University of Chicago, and the School of Library Service, University of California at Los Angeles. The non-library school programs were the School of Information Science, Georgia Institute of Technology, and the Center for the Information Sciences, Lehigh University. The University of Pittsburgh was studied because it has both types of programs in its Graduate School of Library and Information Sciences and its Knowledge Availability Systems Center. The selection of these particular programs for study does not necessarily indicate their superiority over the programs of other universities, e.g., MIT, Harvard, Michigan, Pennsylvania, Western Reserve, Drexel Institute, North Carolina, Cornell, Texas, etc. The detailed descriptions of the five programs selected for study are contained in CODIB-D-113/5.4 of 21 October 1966 and, because of length, will not be repeated here. The results of the study are reflected throughout this report.

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(6) A prominent feature of most university information science programs is the requirement that students seeking admission have a reasonably strong undergraduate or graduate academic background. Many of the programs, particularly those in non-library schools, require the student to have a reasonably strong mathematics background. Actual admission requirements will depend upon the school and the particular line of specialization of each student.

d. University Special Programs

(1) The PFIAB recommendation does not eliminate the possibility of the community arranging for special programs with individual universities. These special programs could take a variety of forms: on-campus or off-campus, full-time or part-time, an amalgam of regular university courses or a group of specially devised courses.

(2) The special program concept may be considerably more difficult to implement than might be expected. First, many universities having an information science program have trouble obtaining sufficient numbers of qualified instructors to design adequate courses and present them effectively. Many universities, therefore, could undertake a special program for the intelligence community only at the risk of serious degradation of their regular program. Second, the interdisciplinary nature of the higher quality programs and the rooting of these programs in several university departments would make it difficult to develop a really effective program without involving a large number of disciplines and the total resources of the host university. Some university officials apparently feel that their information sciences programs encompass such a broad spectrum of subjects that the student should have no difficulty in building a program suited to his particular needs without resort to special courses or curricula. A special program for intelligence personnel might be advantageous to the extent that it would allow the community to exercise greater control over the education of its people. A possible disadvantage of the special program is that it makes little allowance for individual student needs and acts as a "leveler" program. This disadvantage can be compensated for by designing a family of programs or adding facets to a single program; however, those actions could tend to make the special program look like the regular university program.

(3) The intelligence community should consider the special program approach if one or both of the following conditions obtain:

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(a) Students cannot be absent from their jobs long enough to complete a regular graduate program but could be detailed to school duties for a few months for specialized training.

(b) The community has unique, well-defined graduate training requirements which cannot be satisfied by regular university courses of instruction.

(4) The possibility of developing special programs for the intelligence community has been discussed with Dean Swanson, University of Chicago; Professor Slamecka, Georgia Institute of Technology; Dr. Charles W. Shilling, Director, Biological Sciences Communication Project, George Washington University; and Mr. Paul Howerton, Center for Technology and Administration, American University.

(a) Dean Swanson doesn't appear interested in the special program concept and doesn't think such a program is necessary in view of the broad latitude a student has in selecting courses suited to his needs. It should be noted that Dean Swanson's statement was in response to a question which was devoid of any factual information concerning unique community requirements which could not be satisfied by any reasonable combination of regular university courses. Assuming that such unique requirements could be identified, Dean Swanson gave the impression that he still might not be interested in a special program.

(b) Professor Slamecka views special programs as a logical part of the education process and is actively engaged in developing such a program for the National Library of Medicine in the field of information science. He indicated that any formal request from the intelligence community would receive serious consideration.

(c) Dr. Shilling, U.S. representative on the Training of Documentalists Committee of the International Federation for Documentation, has expressed interest in the community's information science training problem. If asked, he would be receptive to a contract effort to study and develop a special program. On the basis of the sketchy information given to him on the special program concept, Dr. Shilling has estimated that the contract effort might cost about \$5000. Obviously, exact cost could vary significantly depending on

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the details of the community's tasking. Dr. Shilling's approach would almost certainly involve the use of university resources in the Washington area. [Dr. Shilling and some members of his staff have security clearances and are working on classified projects.]

(d) Mr. Howerton has indicated a willingness to handle a special program for the intelligence community. He is currently operating special programs for the Army and the Navy; the programs are identical in composition and consist of ten regularly available American University courses. The University will put together special combinations of courses to accommodate an individual group but, because of accreditation requirements, will not alter courses beyond using examples from the group's field of interest and centering computer programming courses around the specific equipment the group uses in its work. The University charges \$1000 per student per program with the requirement that there be no fewer than 25 students or more than 30. In the case of the Army and Navy programs, twenty-four of the thirty credit hours accrued over a 24 week period are applicable to a degree program. An undergraduate degree is not an absolute prerequisite for enrollment in a special program.

e. Specialized Courses and Other Non-University Training.

(1) University programs in information science satisfy only one facet of the intelligence community's total information science training requirement. As mentioned earlier, there is a critical need for a balanced training program which provides for the graduate education of the relatively small number of personnel who require rigorous training in the formal disciplines of information science, and which, at the same time, accommodates the varied and specialized training needs of the remaining large numbers of personnel who need some type of systems or ADP training. The community currently uses a combination of university, industry and Government training facilities to cover such areas as mathematics, computer programming, systems analysis, operations research and library science. Although the training received from these facilities is extremely important and efforts should be made to extend its availability to more people, there are still some training gaps which need to be bridged. These gaps exist mainly in the area of applying academically acquired informa-

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tion science knowledge to practical intelligence problems.

(2) The intelligence community is currently spending approximately \$50 million annually on research and development efforts designed to improve intelligence data handling capabilities. A much larger, indeterminate amount is being expended by the Federal Government as a whole in the general area of information science technology; much of this effort is applicable to the intelligence community's information handling problems. Although it is common practice in the Defense community to conduct formal training programs as a part of the development and introduction of new weapon systems and technology, the intelligence community does not have an organized, formal education program to train intelligence personnel in the application of new technology to intelligence problems. No adequate curriculum for such a program exists either inside or outside the Government. Without such a program, much of the value of this research will be lost.

(3) Examples of subject areas where specialized training is needed are:

(a) Application of operations research to the management of intelligence, with specific reference to:

- Collection and acquisition
- Research and development
- Dissemination
- Production
- ~~Resources~~ (funding and personnel)
- Security

(b) Application of operations research and decision theory to planning in the intelligence community.

(c) Application of probability and predictive inference to the estimates and warning problems.

(d) Application of simulation and gaming to intelligence analysis.

(e) Application of evaluation techniques to intelligence systems, products, and performance.

(f) Application of new concepts of file structuring and categorization to intelligence data.

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organization. A more uniform distribution of students should be sought as soon as practicable. In fact, after a period of training the more senior personnel, agencies might find themselves training predominantly junior people in the grades of GS-7 to GS-12.

(5) The student's supervisors should plan carefully the assignment of the student upon his return from school and should make this plan known to the student. This information plus knowledge of his organization's development objectives will allow the student to select the university and set of courses best suited to his requirements and those of his organization.

(6) Most of the selection criteria covered above apply equally to civilian as well as military personnel in the intelligence community. Special care must be exercised with regard to military personnel selection to insure that normal military training and career development policies are not disregarded.

g. Selection of Personnel for Non-University Training.

The basic philosophy toward the selection of personnel for non-university training in information science should be one of getting as many people trained as time, money and qualifications will permit. There should be no attempt, either deliberate or accidental, to offer training only to those actually engaged in the development and operation intelligence information handling systems. Those selected for training should form a representative cross-section of the community's total operation. Because of the pervasiveness of information science in all aspects of the intelligence function, it is extremely important that analysts, researchers, planners, managers, collectors, disseminators and support personnel be trained in some of the same subjects which the ADP systems specialists study. Course prerequisites for these personnel should be only what is absolutely required to permit understanding of the materials to be presented.

5. CONCLUSIONS

a. The intelligence community requires a balanced information science training program featuring university-level education in the formal disciplines of information science, continued and expanded use of industry and Government systems training facilities, and specialized community training courses aimed at exploiting the results of information technology research and development and teaching the applications of that technology to specific intelligence problems.

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b. The intelligence community

(1) is increasingly dependent upon effective information systems for accomplishment of its missions and, therefore, needs large numbers of information system specialists including personnel trained in the academic theory and foundations of information, and the concepts and application of information processing technology,

(2) does not have an integrated program of university graduate level information science education and other specialized courses to produce the creative systems personnel it needs,

(3) does not have an accurate inventory of its information science personnel resources and requirements to use as a basis for determining existing proficiency levels and how many people need what levels and types of information science training, and

(4) does not have an established mechanism for handling the information science education problem on an integrated, community-wide basis.

c. While it is both practical and desirable to accomplish some types of information science training in the community or in Government facilities, the graduate academic training of information scientists properly belongs in universities which understand general systems theory and modern information technology and which are equipped to administer high quality, complex interdisciplinary programs of higher education. In view of the difficulties many universities are experiencing in getting qualified instructors to develop and teach graduate level information science curricula and because of the interdisciplinary nature of systems or information science programs, a community systems institute cannot be viewed seriously as an instrument for providing the type of advanced training implied by the PFIAB recommendation.

d. Internal community training programs can be effective in bridging the gap between university-acquired academic knowledge and the practical environment of intelligence operations. In the early stages, these internal programs would consist largely of descriptions of various intelligence processes, analyst and user needs, and the information systems in being or under development. The programs should be designed for both the community personnel returning from graduate training and the new personnel recruited from graduate programs. As

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experience is accumulated, the community's own "information scientists" may be able to prepare effective internal programs to further assist the diffusion of systems knowledge and the integration of that knowledge into the real-world functions of the intelligence community.

e. The intelligence community should make effective use of special program arrangements with individual universities to present selected courses to relatively large groups of people during short periods of intensive study, e.g., two month summer programs. Such programs should not be viewed as substitutes for the longer, regular graduate programs but as a supplementary method of diffusing systems knowledge to people unable to attend the regular graduate programs. The non-library schools seem more willing and better equipped to handle special programs than are the conventional library schools.

f. Information science encompasses much more than just computer science. In fact, computer science and machine processing are simply two facets of a complex array of theoretical and technical disciplines. It follows, therefore, that information science education should not be considered the exclusive preserve of the computer or ADP specialist -- perhaps the greater need is held by those who use, manage and handle information, and those for whom machine systems are built and operated. Emphasis should be placed on the selection of students for information science training from areas outside the computer and ADP fields. Upon completion of training, personnel should be returned to the functional areas from which they were selected. Special caution should be exercised to avoid the situation in which returning personnel, regardless of their prior affiliation, are assigned to computer staffs and ADP centers. These staffs and centers, as a general rule, should receive only those people they selected for training or recruited for specific assignments.

g. The community, after becoming knowledgeable of the sources of information science education, should make all reasonable efforts to recruit graduates from these sources. This recruitment would augment but not replace the program of training personnel who already work within the community. In some instances it might be appropriate to select students at the senior undergraduate level, obtain a commitment from them, and pay for their

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graduate education in information science. In other cases, it might be more practical to select graduate students and arrange cooperative work-study programs which would aid the student in completing his education and, at the same time, produce a graduate who already has some familiarity with the intelligence community. These measures could significantly accelerate the build-up of the community's information science resources and proficiencies. Because of the inter-disciplinary nature of information science education at the graduate level, it should be noted that it is possible to recruit subject area specialists who have significant training in information science. For example, many schools are now producing graduates who have majors in economics, mathematics, engineering, psychology, etc., and minors in information science. It is possible, therefore, for an economic intelligence office to recruit an economist who also has a good foundation in information sciences.

h. The intelligence community needs a central mechanism to coordinate community-wide information science training programs; to develop and maintain current inventories of requirements, and descriptions and appraisals of available information science training programs in universities, industry and Government; and to assist member agencies and departments in developing training plans and programs in information science. This mechanism should maintain continuous liaison between the community and the universities, other training activities and professional groups to insure a current awareness of what training is available and, whenever possible or necessary, pass community requirements to those concerned with the formulation of information science education programs.

i. The intelligence community must undertake a precise definition of its information science training requirements and objectives. This type of definition has never been done on a community-wide basis but is a necessity if the community is to do more than simply respond to what is thought to be the requirement.

j. An effective community information science training program will involve substantial expenditures. Responsible people will have to be given extended periods of training away from their jobs. In many organizations, additional funds will have to be made available to cover the costs of training and to upgrade positions to a level which will make it possible to recruit and retain people with requisite skills to perform in a rapidly

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changing information handling environment. The community will achieve the sought-for improvement only at the expense of concerted management action reinforced by money, equipment and people. Whatever the community develops in the line of an information science training program, regardless of how modest the effort might be, will have to be done in the knowledge that large sums of money will not be available and that training will have to compete for funds with other urgent intelligence programs.

6. RECOMMENDATIONS:

It is recommended that USIB:

a. Endorse this report and, wherever feasible, use its good offices to promote community-wide recognition of the importance of developing an adequate number of personnel effectively trained in information science technology.

b. Request the Director of each USIB department or agency to provide top management support for the development of agency policies which:

(1) offer inducements to qualified personnel to acquire training in information science technology,

(2) allow managers to double encumber some positions to compensate for the absence of personnel in training,

(3) stress recruitment of personnel who already have information science training,

(4) encourage their intelligence training organizations to include more courses in information processing and management and the analytical applications of information science techniques, and

(5) provide for the most effective utilization of personnel who obtain training in information science technology.

c. Request each USIB agency or department, not now so engaged, to inventory, in the context of intelligence support, its present systems and information science personnel resources, assess its present and future needs, identify personnel who should receive systems or information science training, develop and maintain training

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25 MAR 1967

MEMORANDUM FOR: The Honorable Robert S. McNamara
The Secretary of Defense

SUBJECT: Establishment of Training Courses at the
Defense Intelligence School in Application
of Information Science Technology to
Intelligence

1. I am attaching for your information a report on Information Science Training for Intelligence Community Personnel, together with my memorandum transmitting it to the President's Foreign Intelligence Advisory Board.

2. The report was prepared in response to a recommendation made by the President's Board to provide specialized training in information systems thinking and skills to selected personnel in the intelligence community. In approving the recommendation, the President requested that it be carried out by the intelligence community under my coordination.

3. The report, prepared by NSIC's Committee on Documentation, has now been completed and concurred in by all members of the Board, including the Director, Defense Intelligence Agency. It recommends a balanced training program consisting of: (a) graduate level training for selected intelligence personnel at universities which have an outstanding program in the field of information science technology; (b) inclusion of additional data handling instruction in established curricula of present Government intelligence training facilities; and (c) specialized training courses at the Defense Intelligence School in applying information science technology to specific categories of intelligence problems.

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4. Although all three facets of this program apply to the Department of Defense, the third one is a responsibility provided uniquely for the Defense Intelligence Agency. What is proposed is specialized training at the Defense Intelligence School for personnel of all departments and agencies of the intelligence community designed to provide mid-career training to military and civilian intelligence personnel in the application of information science technology to intelligence problems. Hopefully the services of outstanding authorities could be enlisted to assist carefully selected in-house personnel in the development of these courses.

5. As a vital part of the overall effort to carry out the President's request that intelligence personnel be provided training in information science technology, I would appreciate it if the Department of Defense would undertake, on a priority basis, the development of these specialized courses at the Defense Intelligence School. As you know, the Director of Defense Research and Engineering has a member on the USIB Committee on Documentation and is thus aware of this proposed program. Also, I understand that this matter has been discussed informally with the Assistant Secretary of Defense (Administration).

SIGNED
SIGNED

Richard Holms
Director

Attachment: A/S

Distribution:

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THE SECRETARY OF DEFENSE
WASHINGTON

13 JUN 1967

MEMORANDUM FOR The Secretaries of the Military Departments
The Director, Defense Intelligence Agency

SUBJECT: Training of Intelligence Personnel in Information
Science Technology

Reference: DCI Memorandum to SecDef, subject: "Establishment
of Training Courses at the Defense Intelligence School
in Application of Information Science Technology to
Intelligence," dated 25 March 1967

The referenced memorandum provides us with a report on
Information Science Training for Intelligence Community Personnel
prepared by the USIB Committee on Documentation in response to a
recommendation, approved by the President, of the President's
Foreign Intelligence Advisory Board.

The report, concurred in by all members of the USIB,
recommends a balanced training program consisting of:

- a. Graduate level training for selected intelligence
personnel at universities which have an outstanding program in
the field of information science technology;
- b. Inclusion of additional data handling instruction
in established curricula of present Government intelligence training
facilities; and
- c. Specialized training courses at the Defense
Intelligence School in applying information science technology to
specific categories of intelligence problems.

The President's stated interest in this program and the
growing dependence of the intelligence community on modern
information handling technology require that we implement the
recommendations of the report in sufficient depth and breadth to
make a meaningful impact on the intelligence data handling
capabilities of the world-wide DOD intelligence community.

In order to promote university graduate-level training in information science for military and civilian intelligence personnel, I request that action be taken during the 1967 Consolidated Intelligence Program review to include in the appropriate program elements of the military departments a phased program of manpower spaces commencing in FY 1969, with annual increments as appropriate. During the same CIP review, the Director, DIA will include in the DIA Consolidated Intelligence Program an appropriate number of additional manpower spaces specifically designated for graduate-level training of DIA personnel in the information sciences commencing in FY 1969.

With respect to established curricula in the department, I note that the Air Force Institute of Technology program includes 15 spaces in FY 1968 for graduate-level training of intelligence personnel in information science. Although this is a modest number, this program should be pursued vigorously in order that these spaces are filled with qualified personnel. Similar programs should be undertaken in the Army, Navy, and DIA.

Finally, I request the Director, Defense Intelligence Agency to develop specialized courses at the Defense Intelligence School in applying information science technology to specific categories of intelligence problems. These courses should commence during FY 1969. Additional funding and resources required by DIA for this effort should be included in the Calendar Year 1967 Consolidated Intelligence Program for FY 1968 and subsequent years. The military departments should take appropriate action to program for student inputs to such courses commencing in FY 1969.

The requirement for both types of information science training mentioned above (courses at the Defense Intelligence School and graduate study in universities) should be incorporated in the qualification standards of appropriate selected positions in the Department of Defense Intelligence Career Development Program.

James L. ...

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UNITED STATES GOVERNMENT

Memorandum

C-651/CC-4

TO : DISTRIBUTION B

DATE: 26 December 1967

FROM : DIADR

SUBJECT: Establishment of the Information Science Center, DIA/JT

1. References:

a. Deputy Secretary of Defense Memorandum for the Secretaries of the Military Departments and Director, Defense Intelligence Agency, dated 13 June 1967, subject: Training of Intelligence Personnel in Information Science Technology.

b. DIAR 49-1, "Organization General," dated 21 October 1965.

2. Pursuant to the mission assigned to DIA by reference 1.a. and under the provisions of reference 1.b., there is established the Information Science Center in the Defense Intelligence School, DIA, effective as of this date.

3. The Information Science Center will be comprised of the Information Science and Intelligence Plans Course and the Information Science and Estimates and Warning Course. The Chief of the Information Science Center will report directly to the Commandant of the Defense Intelligence School.

4. The functional statements for the Information Science Center and an organizational chart depicting it are attached. The establishment of the Information Science Center will be appropriately reflected in revisions to the DIA Organization and Functions Manual, DIAM-49-1, and the JTD.

Joseph F. Carroll
JOSEPH F. CARROLL
Lieutenant General,
USAF
Director

2 Enclosures

1. Functional Statements (C) 1 cy.
2. Organizational Chart (U) 1 cy

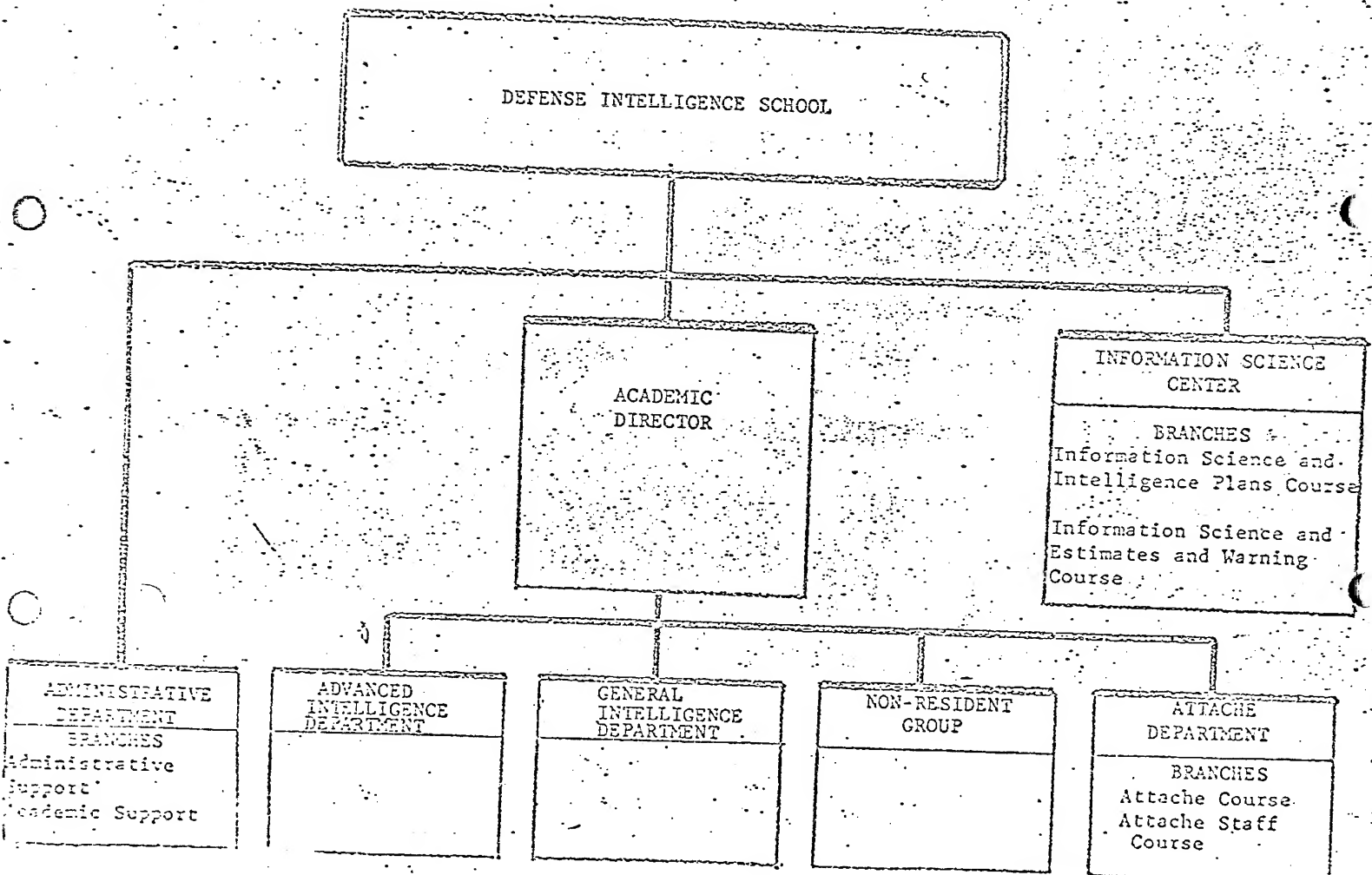
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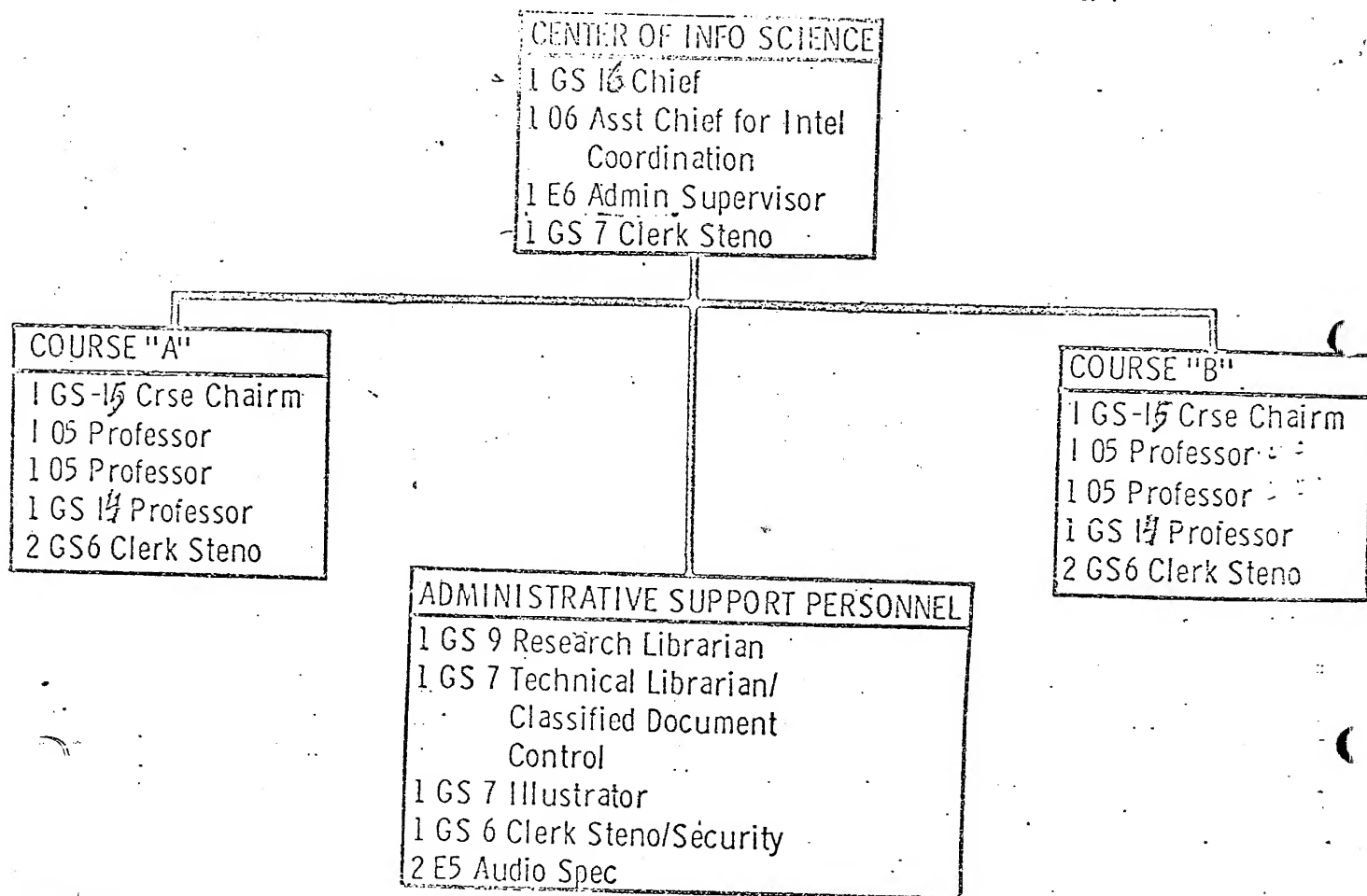
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INFORMATION SCIENCE CENTER

1. Plans, develops and conducts specialized courses of instruction in the application of information science to intelligence planning, estimates and warning and to other specific categories of intelligence problems in sufficient depth and breadth to meet the requirements of the intelligence community.
2. Conducts original research in the field of information science technology relative to intelligence applications in order to develop appropriate courses of instruction for the Center.
3. Provides scientific and technical expertise on academic matters relating to information science and its application to specific intelligence problems.
4. In coordination with the Office of the Academic Director, provides scientific and technical support in all instruction presented by the Defense Intelligence School in the field of information science.
5. Maintains liaison with and coordinates programs of instruction with appropriate elements of departments, agencies and commands which make up the intelligence community.
6. Maintains liaison with military and civilian educational institutions on matters relating to information science.
7. Insures the cross-utilization of instructors, coordination and use of instructional material and other resources throughout the Information Science Center, and the operation of the Faculty Advisory System within the Center.

Enclosure 1 (C-651/CC-4)





PERSONNEL AUTHORIZATION		
MILITARY	PROF CIV	CLERK CIV
8	8	6
TOTAL 8	8	6
GRAND TOTAL 22		

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Attachment to
DDC-104-293
4 February 1972

3 February 1972

U-81113/DIS

MEMORANDUM FOR THE CHAIRMAN, UNITED STATES INTELLIGENCE BOARD

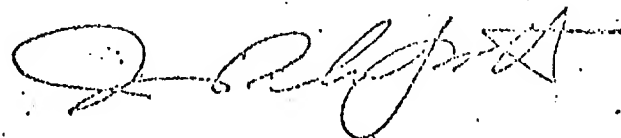
SUBJECT: Closure of the Information Science Center

- References:
- a. DCI Memorandum to SecDef, subject: "Establishment of Training Courses at the Defense Intelligence School in Application of Information Science Technology to Intelligence," 25 March 1967.
 - b. SecDef Memorandum to the Director, DIA, subject: "Training of Intelligence Personnel in Information Science Technology," 13 June 1967.

1. References a and b above, requested the Director, DIA, among other things, to develop specialized courses at the Defense Intelligence School for applying information science techniques to specific categories of intelligence problems. An Information Science Center (ISC) was accordingly set up within DIS for this purpose on 26 December 1967.

2. Due to drastic DoD budgetary cuts and heavy reduction in resources currently being sustained by this agency, DIA will no longer be able to continue the ISC mission. Accordingly, it will be necessary to close the ISC by 30 June 1972. The classes now in session will be the last ones presented by the Center.

3. While the intelligence community wishes to give full support to the ISC, DIA can arrange to provide space for classrooms and faculty, however, DIA can no longer provide funds or personnel.



JAMMIE M. PHILPOTT
Lieutenant General, USAF
Deputy Director

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DD/S 72-2024

23 MAY 1972

Lieutenant General J. M. Philpott, USAF
Deputy Director, Defense Intelligence Agency
The Pentagon
Washington, D. C. 20301

Dear General Philpott:

Thank you for your letter of 13 April 1972 indicating the conditions under which the Defense Intelligence School will provide support to our proposed Information Science Program for FY 1973. The conditions under which the Defense Intelligence School will provide office space, secure classrooms, student study rooms, terminals, equipment and furnishings in Buildings T-42 and T-4 and the necessary security guards, canteen service, utilities and building maintenance are satisfactory.

The Central Intelligence Agency's Director of Training and the Commandant, Defense Intelligence School, have completed the coordination of plans for an interim CIA-managed Information Science Training Program in your Anacostia facilities during FY 1973. A mutually satisfactory arrangement has been achieved which will enable the Agency to program approximately twenty weeks of instruction in Building T-4 during FY 1973.

I appreciate your cooperation in this matter and the helpfulness of the Commandant, Defense Intelligence School, and his staff in the resolution of problems associated with these arrangements.

Sincerely,

/s/ W. E. Colby
W. E. Colby
Executive Director-Comptroller

-2-

ORIGINATOR:

/s/ Hugh T. Cunningham on Original
Hugh T. Cunningham
Director of Training

18 May 1972

Date

CONCUR:

/s/ Robert S. Wattles

22 MAY 1972

John W. Coffey
Deputy Director for Support

Date

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